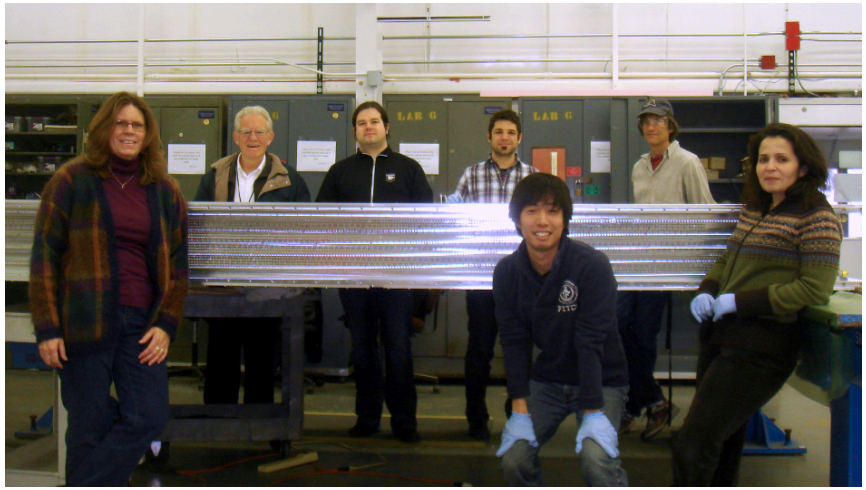
SeaQuest AEM Report

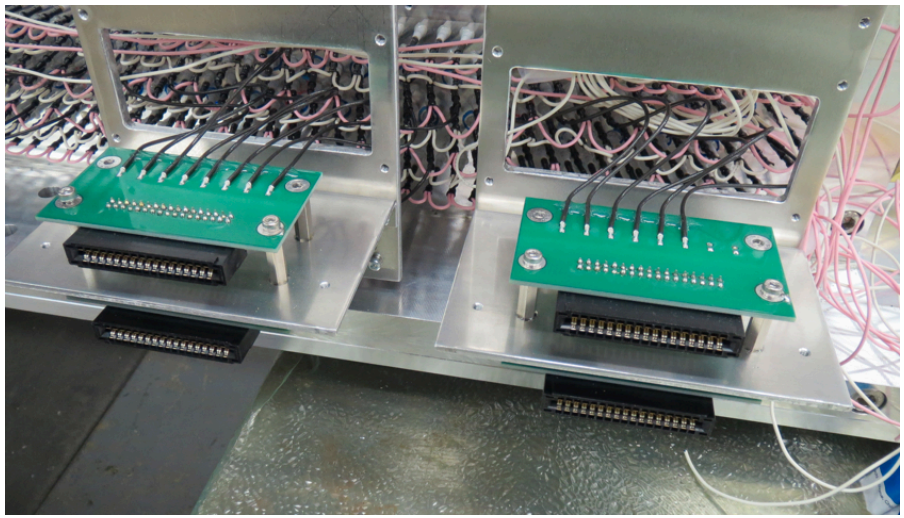
March 4, 2013

- Upgrade Progress
- Analysis
- Beamline

Upgrades – Drift Chambers (Station 3-)

- New station 3- assembly in Lab 6 (with W. Newby) nearly complete.
- Wiring stringing completed (August)
- Mylar windows stretched and attached
- Gas tested and leak rate very small (≈30cc/min)
- Electronics attached (February)
- HV training will begin this month!



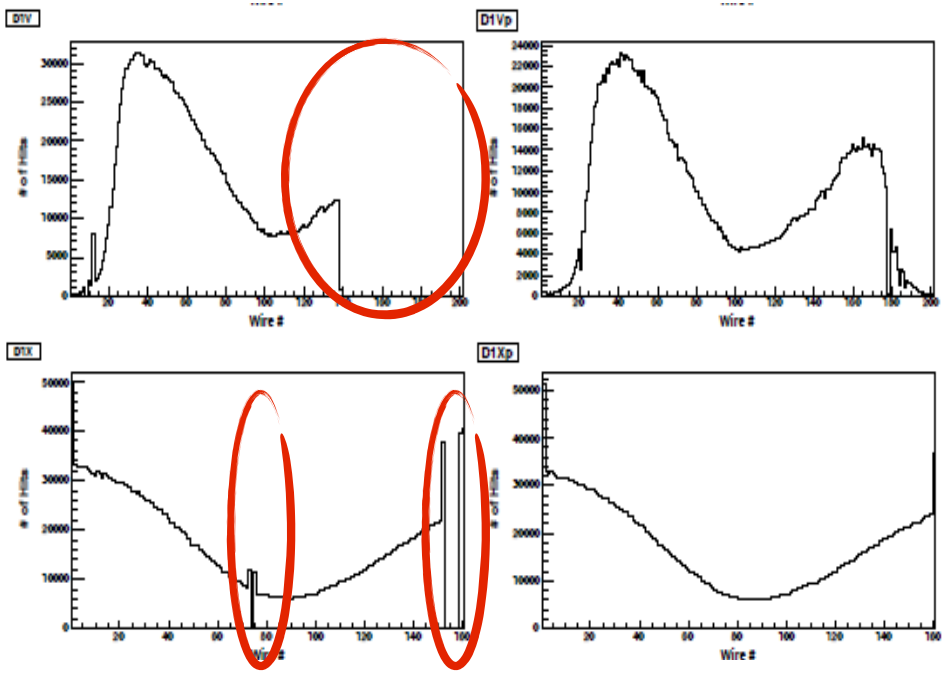


Upgrades – Drift Chambers (New Station 1)

- Most parts completed and ready for assembly
- Stringing area being prepared at University of Colorado
- Expected completion July-August 2013

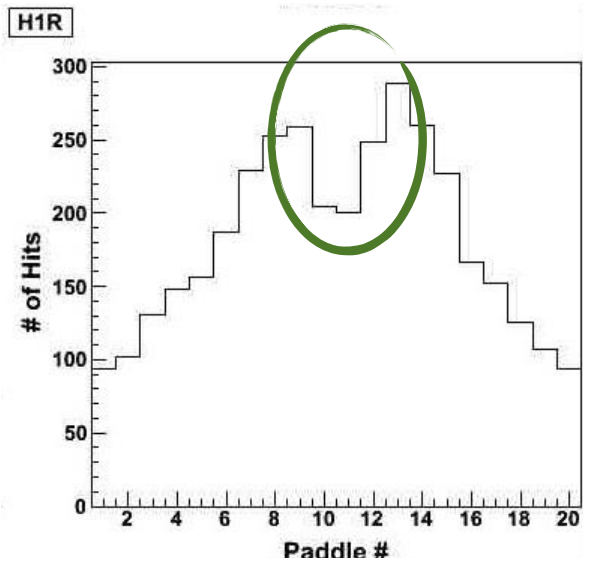
Existing Station 1 being servicing nearly done:

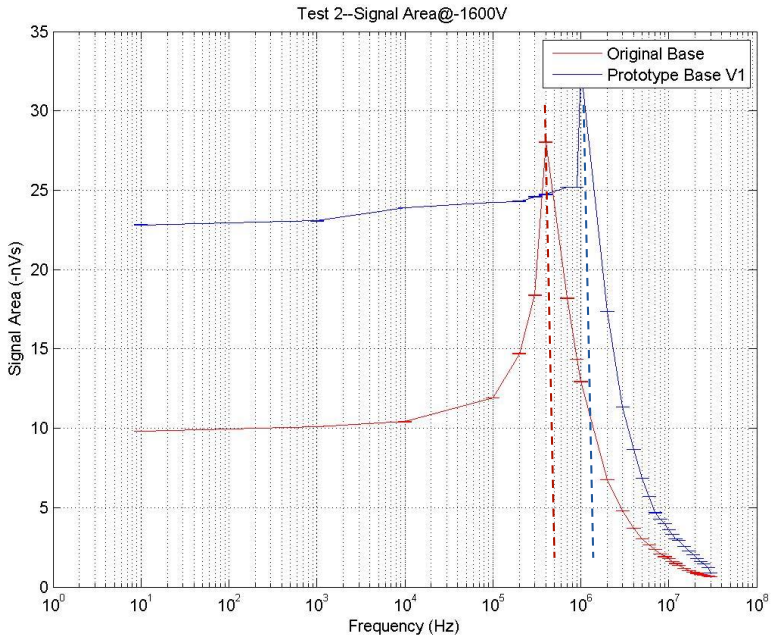
- 1/3 dead *v*-plane repaired
- 3 dead wires repaired
- Incorrectly installed *v'*-plane flipped
- Chamber currently being re-sealed



Upgrades – Hodoscope Bases

- Evidence for sagging PMT voltages under highest rate conditions in central y-measuring counters.
- Several alternate designs investigated at University of Illinois. Solution found with 3-4 times the rate capacity.
- Ready to begin assembly and installation





Upgrades – Electronics

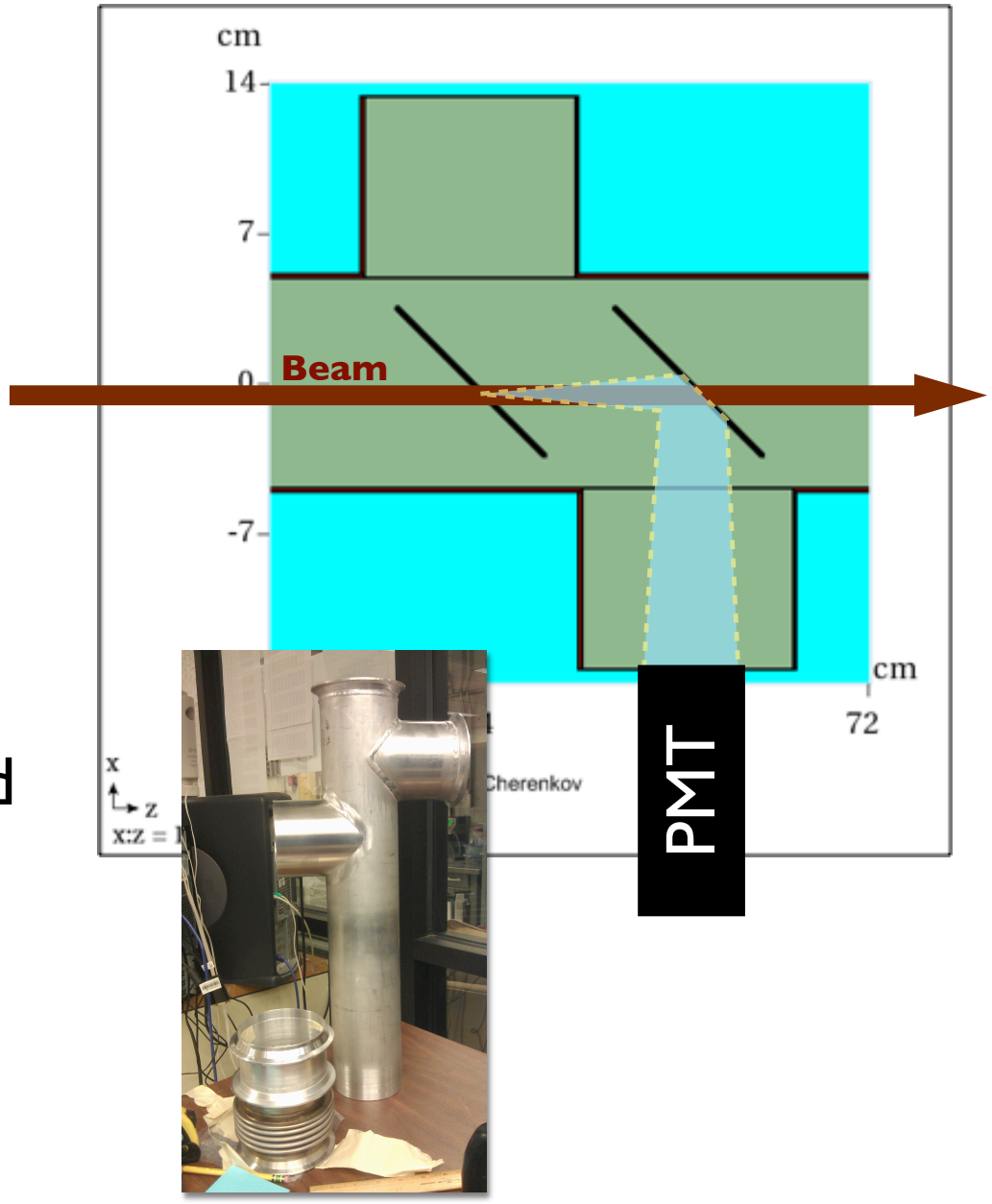
- Improved multi-hit VME TDCs with:
  - on-board zero-suppression (previously done by crate cpu)
  - improved time resolution (2.5ns→0.44ns)
- This will significantly improve live-time. Readout time reduced by a factor of ≈5.

Status:

- New TDC microcode development essentially complete!
- Testing is underway
- Enough time remains to add additional features; e.g. "dead window" after initial hit... or possibly buffered a read-out mode.

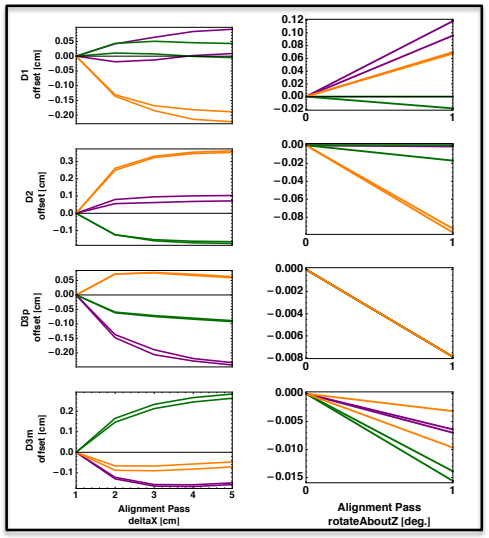
Upgrades – Beamline Cherenkov Monitor

- Provides bucket-by-bucket intensity measurement
- Can provide trigger veto *upstream* of target
- Status:
  - Fabrication 75% complete
  - PMT being tested at UIUC
  - Intensity encoding electronics (QIE-10) in hand
  - Readout board and beam DAQ (w/ FFT and bucket-by-bucket sampling) being developed

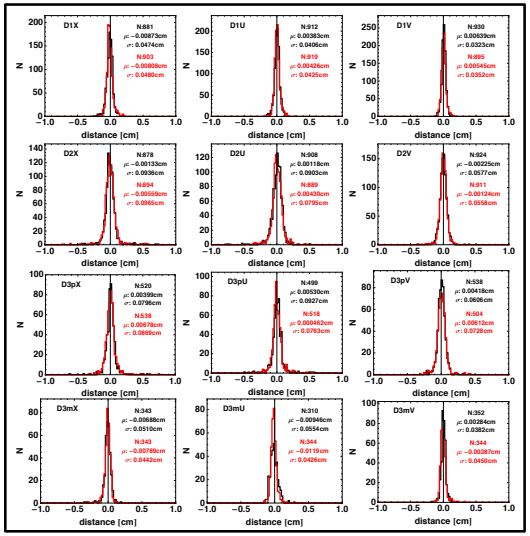


Run I analysis:

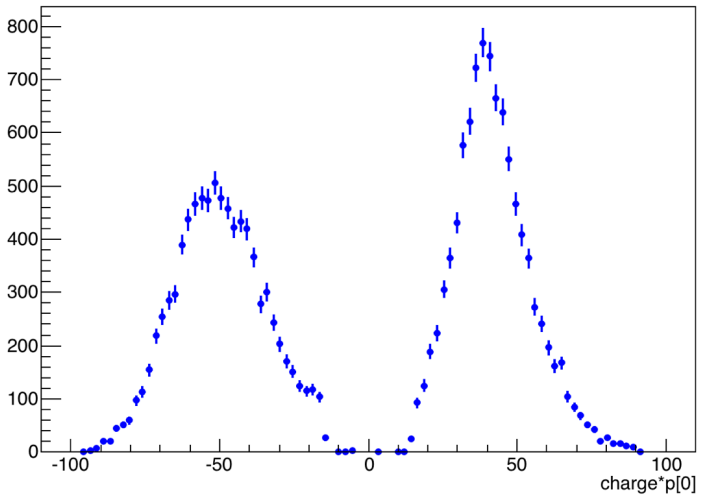
- Survey and tracking alignment now integrated to produce very narrow centered tracking residuals.
- Singles momentum spectrum measured first dimuon mass spectrum reconstructed
- Pattern recognition and determining trigger and tracking efficiencies for high-rate data are current analysis challenges



plane-by-plane alignment adjustments by iteration

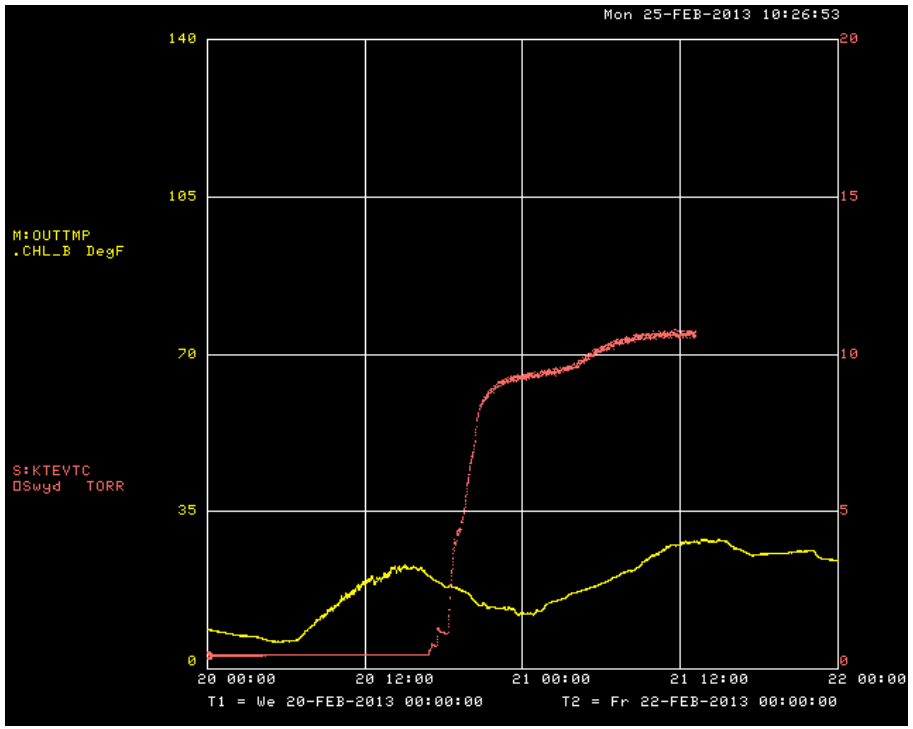


plane-by-plane track residuals



Beamline Vacuum Mystery

- Good vacuum (<1 torr) lost on Feb. 20
- Possibly correlated with power outage to pump station
- Subsequent pumping is reducing pressure at normal rate
- Water being extracted at several liters/day, previously dry
- Visual inspection today with robot will provide more info



- Mike Geelhoed and AD working hard on this and providing frequent updates. *Thanks!*